A Statewide Screening of Mental Health Symptoms Among Juvenile Offenders in Detention

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ABSTRACT

Objective: As awareness of the high prevalence of mental health problems among juvenile offenders has grown, researchers and practitioners have recognized the need for reliable and efficient methods of assessing such problems among large numbers of offenders to ensure that limited treatment resources are applied to those with the greatest need. **Method:** Between May 2000 and October 2002, 18,607 admissions were administered the computerized version of the Massachusetts Youth Screening Instrument Version 2 (MAYSI-2) 24 to 48 hours after their arrival at detention centers throughout Pennsylvania. **Results:** Approximately 70% of the males and 81% of the females scored above the clinical cutoff on at least one of the following five MAYSI-2 scales: Alcohol/Drug Use, Angry-Irritable, Depressed-Anxious, Somatic Complaints, and/or Suicide Ideation. Girls were more likely than boys to exhibit internalizing as well as externalizing problems. Mental health problems were most prevalent among white youths and least prevalent among African American youths. When youths repeated the screen upon subsequent visits to detention, their scores generally remained stable. **Conclusions:** The findings suggest that the MAYSI-2 is a promising triage tool for emergent risk. The use of such a screen may reduce bias in allocation of treatment resources and improves our understanding of the nature of mental health problems in delinquent populations. *J. Am. Acad. Child Adolesc. Psychiatry,* 2004;43(4):430–439. **Key Words:** mental health, juvenile justice, gender differences, ethnic differences.

Numerous studies have attempted to estimate the prevalence of mental disorders among youths in the juvenile justice system (Teplin et al., 2002; Wasserman et al., 2002). Resultant estimates, however, vary considerably. This variation has been attributed to variations in sampling techniques, differences in geographic locales, and inconsistencies in assessment techniques. Generally, though, reported rates of disturbance among youths in the juvenile justice system are exceptionally high (Otto et al., 1992; Teplin et al., 2002). While the prevalence of any mental disorders among community samples of adolescents has been estimated at approximately 20% (Kazdin, 2000), the rate among juvenile offenders is substantially higher, at over 66%. Furthermore, a significant number of youths in the juvenile justice system do not receive treatment for their disorders, and the factors that are most closely associated with receiving treatment are largely unrelated to need. Given the disparity between the need for and the availability of mental health treatment services, a systematic approach to identifying those possibly needing treatment is necessary.

The majority of research on the mental health needs of juvenile offenders has been conducted using male samples, so the results may not generalize to female offenders, who make up a rapidly growing percentage of the juvenile offender population (Chesney-Lind, 1997; Snyder and Sickmund, 1999). A review of 20

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studies on the adult outcomes of antisocial adolescent girls found that these girls tended to have higher mortality rates, a variety of psychiatric problems, dysfunctional and violent relationships, poor educational achievement, and less stable work histories than nondelinquent girls (Pajer, 1998). Additional studies of female offenders suggest important differences from male offenders as well. Male and female juvenile offenders share some background characteristics, such as poverty and familial discord, but in comparison to male offenders, female offenders are more likely to have been physically or sexually abused as children or adults (Chesney-Lind and Sheldon, 1992; Daly, 1994; Gilfus, 1992; Widom, 1989). In nondelinquent populations, girls generally exhibit more internalizing disorders than boys, while boys generally exhibit more externalizing disorders than girls (Coie and Dodge, 1998). A study of serious "deep-end" offenders in the California Youth Authority, however, found that this generalization does not apply to serious juvenile offenders (Espelage et al., 2003). That study found that female offenders exhibit more externalizing problems than male offenders, in addition to exhibiting more internalizing problems. Previous research has not examined whether the gender differences observed in serious offenders also apply to more "typical" juvenile offenders.

Race also has a significant impact on treatment of youths at a number of stages during interactions with the juvenile justice system. Minority youths are more often confined and less often referred for community mental health treatment than white youths (Poe-Yamagata and Jones, 2000; Pope et al., 2002), and white offenders are more often seen as mentally disturbed, while African American offenders are more often defined as disorderly (Cohen et al., 1990; McGarrell, 1993; Westendorp et al., 1986). Some of these differences in diagnosis and treatment may reflect real differences in the prevalence of mental health problems, but several studies suggest that even when the level of disturbance is considered, white youths are disproportionately more likely to receive treatment than minorities in juvenile detention facilities. For example, Dembo et al. (1994) found that of 243 youths assessed in Florida, 38% of whites with mental health problems but only 19% of African Americans with mental health problems received treatment. In a study of 600 youths in state custody in Tennessee, 52% scored in the clinical range on the Child Behavior Checklist: Youth Self-Report and Teacher Rating Form and were identified as in need of treatment (Glisson, 1996). However, only 14% were referred for clinical mental health services. The factors associated with referral, moreover, showed no relationship to the youth's mental health needs. The primary factors correlated with referral were gender (with females more likely to be referred) and ethnicity (with whites more likely to be referred). Such patterns underscore the need for methods of identifying treatment needs that provide a valid indication of mental health status, so that limited treatment resources reach the youths with the greatest need, irrespective of race, age, or gender.

To address the needs of the many youths with mental disorders entering the juvenile justice system, facilities need an efficient way to identify these youths reliably, as well as an understanding of the prevalence of mental health problems in their populations, by type and severity. Among delinquent populations, externalizing disorders are often labeled as "behavior problems," with the result that the underlying causes of the behaviors in question go untreated. Furthermore, when treatment is allocated as a reaction to attention-drawing behavior within an institution, youths with internalizing disorders are inadvertently left untreated. With better information, agencies can begin to identify, implement, and evaluate programs and services intended to reduce mental health-related behavior problems and to improve rehabilitative efforts by alleviating these barriers to treatment. The use of a comprehensive screening tool has the potential to reduce bias in the assessment and treatment of mental health problems in juvenile justice facilities, as well as to improve our understanding of how mental health problems differ as functions of both race and gender.

The Massachusetts Youth Screening Instrument Version 2 (MAYSI-2) was designed to assist juvenile justice facilities in identifying youths who may have special mental health needs (Grisso et al., 2001). It has the potential for use at any entry or transitional placement points in the juvenile justice system (e.g., intake probation, pretrial detention, state youth authority reception centers) and was designed to enable the efficient screening of large numbers of youths. The MAYSI-2 does not provide psychiatric diagnoses, and its content was not selected to correspond to specific *DSM-IV* diagnostic criteria. Rather, the MAYSI-2 is intended to serve primarily an "alerting function" to

provide juvenile justice staff with a method of identifying youths in possible need of more in-depth assessments who might otherwise go unnoticed and untreated. This method of identifying "red flags" that signify possible mental health problems may allow the juvenile justice system to allocate assessment and treatment resources more effectively, based on need rather than on the extent to which an offender's behavior calls attention to itself.

Because the MAYSI-2 is a relatively new tool, its properties are still being evaluated. It has been validated in several studies among delinquent populations (Espelage et al., 2003; Grisso et al., 2001) and compared with more clinically oriented diagnosis tools and other measures of mental health status (Wasserman et al., in press). Such studies have demonstrated that although the screen is much less precise than more exhaustive methods of evaluation, its ease of use makes it attractive as a practical tool for use in screening large numbers of youths when resources for further assessment and treatment are limited.

The goal of the present study was to examine the adequacy of the MAYSI-2 as a screening instrument to be used among youths who enter detention centers. We hypothesized that the observed prevalence of mental health problems would be significantly higher than the levels reported in past studies of nondelinquent adolescent populations, and that females would display more mental health symptoms than males. In addition, we hypothesized that symptoms would vary by race, with white youths exhibiting more mental health symptoms than other ethnic groups. This study also examined the stability of scores among youths who completed the screening more than once. Although MAYSI-2 scores do not align directly with specific diagnoses, we expected that the observed prevalence of clinically significant scores (exceeding pre-established cutoffs) on the various MAYSI-2 subscales would provide useful evidence of the nature and extent of mental health problems in delinquent youths.

METHOD

Sample

Between May 2000 and October 2002, 18,607 admissions were processed through 15 (out of 23) juvenile detention centers throughout Pennsylvania. In this study, we considered "admissions" rather than "individuals." Initially, data to identify repeated administrations of the same youths were unavailable, so youths with multiple visits to detention centers may be represented more than once. As will be discussed, procedures were developed to identify subsequent repeated assessments at a given facility. At the time of processing, the youths were pretrial and ranged in age from 10 to 19 years (for a complete description, see Table 1). Most youths were administered the MAYSI-2 within 24 to 48 hours of their arrival to the facility. This time frame was chosen to allow youths sufficient time to stabilize after arrival but to ascertain their mental health needs in a timely manner.

Procedure

Data for the present study were provided by the Juvenile Detention Centers Association of Pennsylvania (JDCAP) after its implementation of the MAYSI-2 as part of its standard intake procedure at facilities across the state. Before the MAYSI-2 was implemented in each of the detention centers, meetings were held to standardize the instrument's administration across the detention centers by establishing general protocols and identifying detention center staff members responsible for the MAYSI-2 data collection and training at each facility. Several trainings were held on administration of the MAYSI-2 instrument and interpretation of the results, and a procedures manual was developed. After implementing the screen, each facility sent data to the coordinating center every month.

The data provided for analysis included an identification number, race, gender, age, and MAYSI-2 item responses. Although the detention centers had the ability to link identification numbers with individuals, this information was not included in the data provided for this study to protect the youths' confidentiality. Because the screen was part of JDCAP's routine clinical assessment, informed consent was not required. The procedures used in this study were approved by the University of Pittsburgh Institutional Review Board.

Each facility administered the MAYSI-2 via a computerized program called the MAYSI-2 VOICE that reads each question aloud and allows the youth to respond by selecting "yes" or "no" via either

TABLE 1
Sample Description

	Male (n = 15,246)	Female (n = 3,361)
Mean age, yr (SD)	15.7 (1.5)	15.3 (1.5)
Race/ethnicity (%)		
Asian	1	1
African American	47	40
Hispanic/Latino	11	8
White	39	48
Other	2	3
Time of MAYSI-2 administration (%)		
A few hours	12	10
One day	51	52
Two days	24	23
More than two days	13	15
Used a computer before (%)		
No	3	3
Yes	97	97

Note: MAYSI-2 = Massachusetts Youth Screening Instrument Version 2.

the keyboard or a click of the mouse. The youth can click on the question to hear it again and can go backward to change a response if needed. The computer automatically scores the MAYSI-2 and identifies whether the youth meets prespecified criteria for clinical cutoffs.

Before each youth begins the MAYSI-2, brief instructions are given and a demographic questionnaire is administered to identify the youth's age, race, gender, and time of administration. The youth's detention number or identification number is also entered so that each MAYSI-2 profile can be linked to the youth's records at the facility. In addition, a practice question is asked to make sure that the youth understands how to respond on the computer (e.g., "Have you ever used a computer before?"). This preliminary section of the MAYSI-2 is filled out under staff supervision. The actual MAYSI-2 items are then completed privately.

Measures

The Massachusetts Youth Screening Instrument Second Version. The MAYSI-2 is a 52-item inventory used to identify youths at risk for serious mental, emotional, or behavioral disorders and in need of clinical intervention within juvenile justice settings. Respondents answer either "yes" or "no" concerning whether each item has been true for them "within the past few months." Scoring is based on the total number of positive responses, and cutoff thresholds for clinically significant scores have been developed in previous studies (Grisso et al., 2001). The instrument takes approximately 10 to 12 minutes to complete and identifies problems in seven domains: Alcohol/Drug Use (8 items), Angry-Irritable (9 items), Depressed-Anxious (9 items), Somatic Complaints (6 items), Suicide Ideation (5 items), Thought Disturbance (5 items), and Traumatic Experiences (5 items). Based on the factor structure and psychometric properties of the scales, the Thought Disturbance scale is calculated for boys only and the Traumatic Experiences scale is gender-specific. The MAYSI-2 has been found to have good psychometric properties, as evaluated within a test theory framework, and it has been shown to be correlated with both the Millon Adolescent Clinical Inventory and the Child Behavior Checklist-Youth Self-Report (Grisso et al., 2001).

RESULTS

Gender, Race, and Age Differences in Mental Health Symptoms

Based on previously established cutoffs, of the five scales that males and females share in common (Angry-Irritable, $\alpha = .82$; Alcohol/Drug Use, $\alpha = .85$; Depressed-Anxious, $\alpha = .75$; Somatic Complaints, $\alpha = .73$; and Suicide Ideation, $\alpha = .86$), 70% of the males and 81% of the females scored above the clinical cutoff on at least one of the scales (Fig. 1). To determine whether there were significant differences as a function of gender, race, and age, a multivariate analysis of variance (MANOVA) was conducted on the five MAYSI-2 scales. The analysis indicated significant differences with respect to gender (multivariate $F_{5,18021} = 50.3$, $p < .0001$), race (multivariate $F_{10,36042} = 58.5$, $p < .0001$), and age (multivariate $F_{15,49748} = 25.4$, $p <$

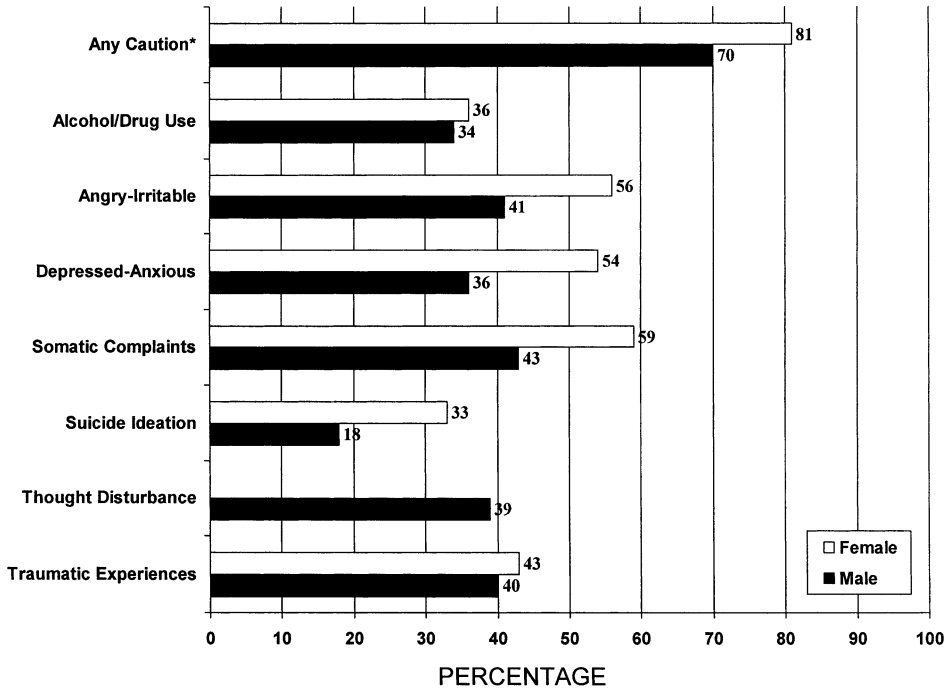

Fig. 1 Percentage of youths above clinical cutoff on Massachusetts Youth Screening Instrument Version 2 (MAYSI-2) scales by males ($n = 15,246$) and females ($n = 3,361$). *The "Any Caution" category includes only the five scales that males and females share in common (excludes Thought Disturbance and Traumatic Experiences).

.0001), as well as a few uninterpretable interactions (Tables 2 and 3).

The univariate analyses indicated that girls presented with more mental health symptoms than boys across all five scales (Alcohol/Drug Use, $F_{1,50} = 8.6$, $p < .005$; Angry-Irritable, $F_{1804} = 105.9$, $p < .001$; Depressed-Anxious, $F_{1862} = 183.1$, $p < .001$; Somatic Complaints, $F_{1374} = 112.7$, $p < .001$; and Suicide Ideation, $F_{1396} = 188$, $p < .001$) and that white youths were more likely to present with mental health problems than Hispanic youths, who in turn presented with more mental health problems than African American youths (Alcohol/Drug Use, $F_{2864} = 148.6$, $p < .001$; Angry-Irritable, $F_{2133} = 17.6$, $p < .001$; Somatic Complaints, $F_{2319} = 96.3$, $p < .001$; and Suicide Ideation, $F_{2130} = 62.0$, $p < .001$), except in the area of Depressed-Anxious, where Hispanic youths were more likely to score higher than white youths, who in turn were higher than African American youths (Depressed-Anxious, $F_{2111} = 23.6$, $p < .001$). The univariate analyses also indicated that older youths were more likely to present with alcohol/drug use symptoms than younger youths ($F_{3362} = 62.2$, $p < .001$), while younger youths were more likely to present with anger/irritable symptoms than older youths ($F_{3,99} = 12.9$, $p < .001$). There were no other significant age differences at the univariate level.

There was one significant interaction by gender and age in the area of alcohol/drug use ($F_{3,36} = 6.1$, $p < .001$). Specifically, among 10- to 15-year-olds, girls were more likely to exhibit symptoms of alcohol/drug abuse than boys, whereas there were no differences in substance abuse between girls and boys 16 to 19 years of age. There was one significant interaction between gender and race in the area of somatic complaints ($F_{2,16} = 4.8$, $p < .01$) and three significant interactions between age and race on the Alcohol/Drug Use scale ($F_{6,21} = 3.6$, $p < .01$), the Depressed-Anxious scale ($F_{6,27} = 5.7$, $p < .001$), and the Somatic Complaints scale ($F_{6,11} = 10.6$, $p < .01$). These interactions, however, did not exhibit a consistent or easily interpretable pattern.

Since the Thought Disturbance scale is computed for males only ($\alpha = .57$), separate analyses were conducted to determine whether there were race/ethnicity and/or age differences on this scale. Results indicated that Hispanic males were more likely to present with disordered thought processes than white or African American males ($F_{2,1} = 8.9$, $p < .001$). In addition, male youths age 10 to 13 years were more likely to have problems with reality orientation than any other age

TABLE 2
Mean Scores (and Standard Errors) on the MAYSI-2 Scales by Gender and Race

	Males			
	African American (n = 7,242)	Hispanic (n = 1,616)	White (n = 5,950)	Significant Scheffé Post Hoc
Alcohol/Drug Use	1.76 (0.038)	2.21 (0.079)	2.97 (0.044)	W > H > AA
Angry-Irritable	3.53 (0.044)	3.79 (0.091)	4.13 (0.050)	W > H > AA
Depressed-Anxious	1.99 (0.035)	2.70 (0.071)	2.26 (0.039)	H > W > AA
Somatic Complaints	2.05 (0.029)	2.44 (0.060)	2.62 (0.033)	W > H > AA
Suicide Ideation	0.52 (0.023)	0.81 (0.048)	0.92 (0.026)	W > H > AA
Thought Disturbance	0.118 (0.003)	0.139 (0.006)	0.135 (0.003)	H > W > AA
Traumatic Experiences	1.99 (0.024)	2.14 (0.049)	2.08 (0.027)	H > W > AA
	Females			
	African American (n = 1,331)	Hispanic (n = 272)	White (n = 1,638)	Significant Scheffé Post Hoc
Alcohol/Drug Use	1.91 (0.093)	2.62 (0.181)	3.12 (0.087)	W > H > AA
Angry-Irritable	4.54 (0.106)	4.85 (0.206)	4.90 (0.100)	W > H > AA
Depressed-Anxious	3.01 (0.084)	3.60 (0.163)	3.29 (0.079)	H > W > AA
Somatic Complaints	2.54 (0.070)	3.08 (0.136)	3.44 (0.066)	W > H > AA
Suicide Ideation	1.10 (0.056)	1.52 (0.109)	1.62 (0.053)	W > H > AA
Traumatic Experiences	1.97 (0.063)	2.28 (0.122)	2.43 (0.059)	W, H > AA

Note: MAYSI-2 = Massachusetts Youth Screening Instrument Version 2.

TABLE 3
Mean Scores (and Standard Errors) on the MAYSI-2 Scales by Gender and Age

	Males				
	(1) 10–13 yr (n = 1,260)	(2) 14–15 yr (n = 4,738)	(3) 16–17 yr (n = 8,019)	(4) 18–19 yr (n = 1,229)	Significant Scheffé Post Hoc
Alcohol/Drug Use	1.17 (0.089)	2.24 (0.046)	2.83 (0.033)	3.01 (0.078)	1 < 2 < 3,4
Angry-Irritable	4.13 (0.102)	3.97 (0.052)	3.81 (0.038)	3.35 (0.089)	1 > 2 > 3 > 4
Depressed-Anxious	2.47 (0.080)	2.26 (0.041)	2.31 (0.030)	2.23 (0.070)	No significant differences
Somatic Complaints	2.37 (0.067)	2.35 (0.034)	2.42 (0.025)	2.35 (0.059)	No significant differences
Suicide Ideation	0.77 (0.054)	0.73 (0.027)	0.79 (0.020)	0.70 (0.047)	No significant differences
Thought Disturbance[a]	0.157 (0.007)	0.128 (0.004)	0.127 (0.003)	0.112 (0.006)	1 > 2, 3, 4
Traumatic Experiences	1.75 (0.055)	2.02 (0.028)	2.25 (0.021)	2.27 (0.048)	1 < 2 < 3,4
	Females				
	(1) 10–13 yr (n = 421)	(2) 14–15 yr (n = 1,368)	(3) 16–17 yr (n = 1,616)	(4) 18–19 yr (n = 5,950)	Significant Scheffé Post Hoc
Alcohol/Drug Use	1.86 (0.150)	2.54 (0.093)	2.73 (0.091)	3.07 (0.218)	1 < 2 < 3,4
Angry-Irritable	5.22 (0.171)	4.98 (0.106)	4.68 (0.104)	4.16 (0.250)	1 > 2 > 3 > 4
Depressed-Anxious	3.21 (0.135)	3.31 (0.083)	3.44 (0.082)	3.23 (0.196)	No significant differences
Somatic Complaints	2.95 (0.113)	3.03 (0.070)	3.25 (0.069)	2.85 (0.165)	No significant differences
Suicide Ideation	1.38 (0.090)	1.39 (0.056)	1.40 (0.055)	1.50 (0.131)	No significant differences
Traumatic Experiences	1.77 (0.101)	2.18 (0.063)	2.46 (0.061)	2.50 (0.147)	1 < 2 < 3,4

Note: MAYSI-2 = Massachusetts Youth Screening Instrument Version 2.
[a] Boys only.

group ($F_{3,1}$ = 7.7, p < .001). There was also a significant interaction by age and race ($F_{2,33}$ = 8.9, p < .05), but examination of this interaction did not yield interpretable findings.

While the MAYSI-2 provides a Traumatic Experiences scale for both genders (male α = .51, female α = .71), this scale is gender-specific, which makes comparisons between males and females difficult. Moreover, specific cutoff scores have not been published for the Traumatic Experiences scale. We thus conducted gender-specific analyses to determine whether there were race or age differences and used an ad hoc cutoff threshold of 3 (out of a maximum possible scale score of 5) for both genders (Fig. 1). Results indicated that for both males and females, older youths were more likely to present with traumatic experiences than younger youths (males, $F_{3,76}$ = 34.1, p < .001; females, $F_{3,34}$ = 12.8, p < .001). For males, Hispanic males were more likely to report traumatic experiences than white males, who in turn were higher than African American males ($F_{2,11}$ = 4.8, p < .01), whereas for females, both Hispanic and white females were more likely to have experienced a trauma than African American females ($F_{2,39}$ = 14.6, p < .001). There was a significant but uninterpretable interaction between age and race among males on the Traumatic Experiences scale ($F_{6,13}$ = 12.9, p < .001) but not among females.

Does the Time of Administration Influence the Reporting of Symptoms?

As detention centers need to establish effective policies for when to screen youths for mental health problems, analyses were conducted to determine whether the time of administration influenced reporting on the MAYSI-2 scales. While 75% of the youths were administered the MAYSI-2 24 to 48 hours of their arrival to the detention facility as determined by the established protocol, some youths were given the MAYSI-2 very early in their stay (12% within the first few hours) and some much later in their stay (13% after 48 hours). An analysis of covariance (ANCOVA) was conducted to determine whether the timing of the screen administration was correlated with the various subscale scores. As noted above, because the mental health symptoms differed with respect to gender, race/ethnicity, and age, it was necessary to control for these variables in these

analyses. The timing of administration of the MAYSI-2 did exhibit a relation to reported mental health problems, with youths who had been at the facility only a few hours less likely to report mental health symptoms than youths who had been there longer (Alcohol/Drug Use, $F_{3238} = 40.8$, $p < .001$; Angry-Irritable, $F_{3,69} = 9.0$, $p < .001$; Depressed-Anxious, $F_{3,49} = 10.2$, $p < .001$; Somatic Complaints, $F_{3,17} = 4.9$, $p < .01$; and Suicide Ideation, $F_{3,6.9} = 3.3$, $p < .05$).

Since the Thought Disturbance and Traumatic Experiences scales are gender-specific, the analyses were run separately by gender to determine whether the timing of administration was significant. Results indicated that timing did influence reporting on the Thought Disturbance scale for males ($F_{3,0.133} = 3.6$, $p < .05$) and for the Traumatic Experiences scale for both males ($F_{3,47} = 20.7$, $p < .001$) and females ($F_{3,7} = 2.5$, $p < .06$), with those who had been at the facility for only a few hours less likely to report mental health symptoms than youths who had been there longer.

Notably, these results are difficult to interpret, since there may be selection effects that contribute to the observed differences, and since no "gold standard" measure was used to determine which timing strategy yields the most useful information.

How Are MAYSI-2 Scores Affected by Repeat Administrations?

Of the total sample of 18,607 admissions examined in this study, the first 10,407 (phase 1) admissions did not include the necessary information to identify repeat administrations. The subsequent 8,200 admissions (phase 2) included enough information to identify youths with multiple admissions at a given facility (but not those who might have been assessed at more than one detention center). To determine the stability of the MAYSI-2 over time, we selected only youths with two administrations of the MAYSI-2 that were at least 2 weeks and at most 1 year apart ($N = 1,284$) and examined their change in MAYSI-2 score by each scale. Controlling for age, race, and gender, youths' scores changed very little between administrations, and overtime correlations remained high (ranging from $r = 0.38$ to $r = 0.58$).

The average length of time between the first administration and the second administration was 111 days. To determine whether time between administrations affects the stability of MAYSI-2 scores, the sample was split at the median with respect to the time between MAYSI-2 administrations (87 days) and the analyses were run again within each group. Correlations tended to be lower for longer periods of time between administrations of the instrument (Table 4).

DISCUSSION

As the number of studies documenting the high prevalence of mental health problems among juvenile offenders has grown, researchers and practitioners have recognized the need for systematic, reliable, and effi-

TABLE 4
Mean Change (SD) and Correlations in MAYSI-2 Scores Between Time 1 and Time 2

	Early Repeaters (<87 days) ($n = 647$)		Late Repeaters (>87 days) ($n = 637$)	
	Mean Change (SD)	r ($p < 0.001$)	Mean Change (SD)	r ($p < 0.001$)
Alcohol/Drug Use*	0.05 (1.99)	0.66	0.10 (2.46)	0.48
Angry-Irritable**	−0.20 (2.56)	0.57	−0.06 (2.75)	0.49
Depressed-Anxious**	−0.01 (2.26)	0.45	−0.01 (2.42)	0.37
Somatic Complaints	−0.07 (1.95)	0.48	−0.06 (2.00)	0.45
Suicide Ideation**	0.05 (1.56)	0.44	0.02 (1.70)	0.33
Thought Disturbance[a]*	−0.01 (0.21)	0.48	−0.01 (0.22)	0.27
Traumatic Experiences[a]	−0.12 (1.18)	0.50	−0.12 (1.65)	0.48
Traumatic Experiences[b]**	−0.13 (1.47)	0.70	0.18 (1.52)	0.46

Note: The Fisher Z was used to compare the correlations between the two groups. MAYSI-2 = Massachusetts Youth Screening Instrument Version 2.

[a] Boys only.

[b] Girls only.

* Significant at $p < .001$; **significant at $p < .05$.

cient methods of assessing such needs in large numbers of offenders. The MAYSI-2 is one of the first screens specifically developed for this population in order to provide a rapid assessment of important dimensions of mental health in large numbers of youths who enter detention. A large percentage (70% of males and 81% of females) of incoming admissions at Pennsylvania detention centers present with some type of mental health problem that may require further clinical evaluation. These mental health problems are most likely to be seen among girls and least likely to be seen among African American youths. In addition, the timing of administration is important to consider, because youths who take the screen within the first few hours of arrival report fewer symptoms than those who take the screen later. Finally, it appears that when youths repeat the screen upon subsequent visits to detention, their scores generally remain stable, with variations on the order of 2 or 3 points on most scales.

The aggregate MAYSI-2 statistics for all incoming detention center admissions (Table 2) highlight the heterogeneity of mental health symptoms among juvenile offenders. Regardless of race and age, girls are more likely to present with mental health symptoms than boys. In addition, African American youths are the least likely to present with mental health symptoms. Finally, while older youths are more likely to present with alcohol/drug use problems and traumatic experiences, younger youths are more likely to present with anger-irritable symptoms as well as depressed-anxious moods. This age difference is consistent with anecdotal evidence provided by detention center staff members, who report that younger youths are more emotionally volatile and more difficult to control. My findings, overall, are consistent with the results of previous research among youths in the juvenile justice system (Grisso et al., 2001; Timmons-Mitchell et al., 1997).

The observed gender differences on the Depressed-Anxious, Somatic Complaints, and Suicide Ideation scales are not surprising, since previous research among adolescent girls has shown that girls are more likely than boys to suffer from internalizing disorders (Nolen-Hoeksema and Girgus, 1994). Especially noteworthy are the observed differences between males and females on the Alcohol/Drug Use and Angry-Irritable scales. While previous research has shown that boys generally exhibit externalizing problems more frequently than girls, this study appears to corroborate recent evidence that detained girls are not only more likely than detained boys to internalize their problems, but they are also more likely to externalize (Espelage et al., 2003).

There are several possible reasons for the gender differences observed in this study and others. It may be, for example, that law enforcers and judges are less likely to send females to detention, and that those girls who are sent to detention are therefore those with the most serious behavioral problems (Girls Incorporated, 1996). In addition, it may be that female delinquency itself is a symptom of significant mental health problems. Accordingly, delinquent behavior may select mentally disturbed youths more strongly among girls than among boys. Additional filtering out of all but the most visibly troubled girls by police and judges could understandably result in a population of detained females with significantly higher levels of disturbance than their male counterparts (who need not be as "troubled" to engage in illegal behavior, and who need not appear as "troublesome" to be detained). Because female offenders make up a rapidly growing percentage of the population of incarcerated youths, this population poses significant challenges to correctional systems.

Similar biases may also underlie the observed racial differences in mental health problems among detained youths. Selective filtering by police and judges may result in a detained population in which minority youths need not exhibit the same levels of disturbance as white youths in order to be included. Minority youths are more likely to be overrepresented in the justice system and to receive more severe sanctions at each stage in processing. Courts are more likely to deem white juvenile offenders as mentally disturbed and African American offenders as disorderly (Cohen et al., 1990). Such differences may be due to (1) real differences in the prevalence of mental disturbance, (2) differences in self-reporting of mental health problems, or (3) systemic bias that makes one ethnic group more likely than another to be referred for assessment, diagnosed as disturbed, or assigned to treatment programs. There is evidence that all three effects may be real. In community samples, rates of mental disturbance are typically similar or higher among white youths than among African American youths (Angold et al., 2002; Costello et al., 2001). Yet such differences are at least partly a consequence of racial differences in the stigma associated with mental illness, which can inhibit reporting of symptoms (Satcher, 2001). (MAYSI-2

symptoms, too, are thus more likely to be underreported among minorities than among whites.) Even among youths with similar treatment needs, however, white youths are disproportionately more likely to receive treatment than minority youths (Dembo et al., 1994; Glisson, 1996; Thomas and Stubbe, 1996).

The observed relation between the timing of the screen, relative to arrival at a facility, and the scores obtained on the various subscales suggests that additional exploration of this effect is needed. Selection biases (for example, with less troubled youths more likely to receive the screen within hours of arrival) cannot be ruled out without randomly assigning youths to preset administration times. Furthermore, without an independent measure of mental health needs, the most appropriate choice of timing cannot be identified. If the observed effect is not entirely due to selection biases, it may be that early administration results in underreporting of symptoms, or that later administration results in overreporting. Additional research is needed to understand the mechanism behind the observed relation between the timing of screen administration and reported symptomatology.

Limitations

While this study provided a statewide screening of mental health symptomatology using standardized assessments, some caveats should be kept in mind when interpreting the results. First, the data refer to admissions rather than individuals. While we were able to identify repeat admissions to the same facility within the 8,200 admissions in phase 2 (the phase during which the information necessary to identify repeat admissions became available), we could not identify individuals who had multiple admissions to different facilities, or link data from phase 1 admissions with other admissions assessed in either phase. With regard to interpreting the results, note, first, that when the analyses were performed on a subset of 6,872 admissions that are known to represent different individuals, none of the substantive results were changed. Second, the consideration of "admissions" rather than "individuals" is preferable, from the facilities' viewpoint, since such an approach more accurately reflects the overall "time-averaged" population they are treating and is more relevant to resource allocation decisions.

The findings are also limited in scope because the sample was restricted to juvenile offenders in detention. Without a comparison group of nondelinquent youths, only indirect comparisons based on previous studies can be made.

Finally, the MAYSI-2 is a self-report instrument (making it susceptible to a number of reporting biases). It identifies only symptom domains in need of further assessment and may produce both false positives and false negatives. Previous research using both the MAYSI-2 and the Diagnostic Interview Schedule for Children IV (DISC-IV) suggests that scores that reach the clinical cutoff on any MAYSI-2 subscale will identify youths with diagnosed psychiatric disorders (Wasserman et al., in press), but that there are often discrepancies between the disorder "suggested" by an elevated score on a MAYSI-2 subscale and the disorder diagnosed by the DISC. This may reflect the high rates of comorbidity common in young offenders, as well as the lack of direct alignment between MAYSI-2 scales and diagnostic categories. Thus, while scores on the MAYSI-2 are loosely related to more rigorously derived diagnoses, the MAYSI-2 has difficulty discriminating between highly comorbid disorders. The diagnostic limitations of the MAYSI-2 are a consequence of its optimization as an efficient screening tool for use on large populations with minimal assessment resources. This suggests that the MAYSI-2 is best used as a triage tool for emergent risk (Grisso et al., 2001; Wasserman et al., 2003).

Clinical Implications

Despite the limitations noted above, this study's findings have important implications for treatment and services as well as for our understanding of gender and ethnic differences in the prevalence of mental health problems among juvenile delinquent populations. Previous research has demonstrated that white youths are more likely to receive treatment than African American youths, controlling for need. This may be due, in part, to the lack of a reliable mechanism for identifying those in need of services, to the perceptions of juvenile justice personnel regarding appropriate responses to different types of mental illness, or to resource limitations that result in treatment of only the most disruptive admissions. The implementation of the MAYSI-2 is a first step in reducing bias in referral and providing a more systematic allocation of limited assessment and treatment resources.

Given the high prevalence of mental health problems among juvenile offenders, effective rehabilitation

requires that (1) such problems be accurately diagnosed (through initial screening and subsequent clinical assessment, when indicated); (2) those in need of treatment receive it; and (3) the services provided be appropriate for the developmental and ethnic context in which they are received. The accurate identification of youths in need of mental health services is not, by itself, sufficient to improve the effectiveness of rehabilitation efforts. Once mental health problems are identified, treatment programs and interventions must be tailored either to address these problems specifically or to take them into account when addressing other (e.g., behavioral or interpersonal) problems. This type of information will not only allow for an evaluation of how well services are matched with the needs of juvenile offenders, but will also serve as a starting point for more detailed analyses of the effectiveness of different services among delinquent populations with diverse mental health conditions.

REFERENCES

Angold A, Erkanli A, Farmer E et al. (2002), Psychiatric disorder, impairment, and service use in rural African American and White youth. *Arch Gen Psychiatry* 59:893–904

Chesney-Lind M (1997), *The Female Offender: Girls, Women and Crime.* Thousand Oaks, CA.: Sage

Chesney-Lind M, Sheldon R (1992), *Girls, Delinquency, and Juvenile Justice.* Pacific Grove, CA: Brooks/Cole

Cohen P, Parmelee D, Irwin L et al. (1990), Characteristics of children and adolescents in a psychiatric hospital and a corrections facility. *J Am Acad Child Adolesc Psychiatry* 29:909–913

Coie JD, Dodge KA (1998), Aggression and antisocial behavior. In: *Handbook of Child Psychology*, 5th ed. *Vol. 3: Social, Emotional, and Personality Development*, Eisenberg N, vol. ed. New York: Wiley

Costello J, Keeler G, Angold A (2001), Poverty, race/ethnicity, and psychiatric disorder: a study of rural children. *Am J Public Health* 91:1494–1498

Daly K (1994), *Gender, Crime and Punishment.* New Haven: Yale University Press

Dembo R, Turner G, Borden P, Schmeidler J (1994), Screening high-risk youths for potential problems: field application in the use of the Problem-Oriented Screening Instrument for Teenagers (POSIT). *J Child Adolesc Subst Abuse* 3:69–93

Espelage D, Cauffman E, Broidy L, Mazerolle P, Piquero A, Steiner H (2003), A cluster-analytic investigation of MMPI profiles of serious male and female juvenile offenders. *J Am Acad Child Adolesc Psychiatry* 42:770–777

Gilfus M (1992), From victims to survivors to offenders: women's routes to entry and immersion into street crime. *Women Criminal Justice* 4:63–89

Girls Incorporated (1996), *Prevention and Parity: Girls in Juvenile Justice*. Indianapolis: Girls Incorporated National Resource Center

Glisson C (1996), Judicial and service decisions for children entering state custody: the limited role of mental health. *Soc Serv Rev* 70:257–281

Grisso T, Barnum R, Fletcher KE, Cauffman E, Peuschold D (2001), Massachusetts Youth Screening Instrument for mental health needs of juvenile justice youths. *J Am Acad Child Adolesc Psychiatry* 40:541–548

Kazdin A (2000), Adolescent development, mental disorders, and decision making of delinquent youths. In: *Youth on Trial*, Grisso T, Schwartz R, eds. Chicago: University of Chicago Press, pp 33–65

McGarrell E (1993), Trends in racial disproportionality in juvenile court processing: 1985–1989. *Crime Delinquency* 39:29–48

Nolen-Hoeksema S, Girgus JS (1994), The emergence of gender differences in depression during adolescence. *Psychol Bull* 115:424–443

Otto R, Greenstein J, Johnson M, Friedman R (1992), Prevalence of mental disorders among youth in the juvenile justice system. In: *Responding to the Mental Health Needs of Youth in the Juvenile System*, Cocozza J, ed. Seattle: National Coalition for the Mentally Ill in the Criminal Justice System, pp 7–48

Pajer K (1998), What happens to bad girls? A review of the adult outcomes of antisocial adolescent girls. *Am J Psychiatry* 155:862–870

Poe-Yamagata E, Jones M (2000), *And Justice for Some: Differential Treatment of Minority Youth in the Justice System.* Washington, DC: Building Blocks for Youth

Pope C, Lovell R, Hsia H (2002), *Disproportionate Minority Confinement: A Review of the Research Literature from 1989 through 2001.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention

Satcher D (2001), *Mental Health: Culture, Race, and Ethnicity—A Supplement to Mental Health: A Report of the Surgeon General.* Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services

Snyder H, Sickmund M (1999), *Juvenile Offenders and Victims: 1999 National Report (NCJ 178257).* Washington, DC: US Department of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Teplin L, Abram K, McClelland G, Dulcan M, Mina K, Mericle AA (2002), Psychiatric disorders in youth in juvenile detention. *Arch Gen Psychiatry* 59:1133–1143

Thomas J, Stubbe D (1996), A comparison of correctional and mental health referrals in the juvenile court. *Psychiatry Law* 24:379–400

Timmons-Mitchell J, Brown C, Schulz C, Webster S, Underwood L, Semple W (1997), Comparing the mental needs of female and male incarcerated juvenile delinquents. *Behav Sci Law* 15:195–202

Wasserman G, Jensen P, Ko S et al. (2003), Mental health assessments in juvenile justice: report on the consensus conference. *J Am Acad Child Adolesc Psychiatry* 42:751–761

Wasserman G, McReynolds L, Ko S et al. (in press), Screening for emergent risk and psychiatric disorder among incarcerated youth: comparing MAYSI-2 and voice DISC-IV. *J Am Acad Child Adolesc Psychiatry*

Wasserman GA, McReynolds L, Larkin S et al. (2002), The voice DISC-IV with incarcerated youths: prevalence of disorder. *J Am Acad Child Adolesc Psychiatry* 41:314–321

Westendorp F, Brink K, Roberson M, Ortiz I (1986), Variables which differentiate placement of adolescents into juvenile justice or mental health systems. *Adolescence* 21:23–37

Widom C (1989), Child abuse, neglect, and violent criminal behavior. *Criminology* 27:251–271